

## ABSTRACT

A transmitter, receiver, and communication system that utilize a pseudo-random number sequence (PRNS) output unit that provides a PRNS of length  $N$ . The PRNS output unit generates the PRNS responsive to a number ( $s$ ) of prescribed positive integers ( $q_x$ ), a prescribed real impulse constant ( $r$ ), and a prescribed non-zero real constant ( $C$ ), where  $1 < x < s$ . The PRNS output unit includes an input acceptance section that accepts the number ( $s$ ) of real number sequence initial values ( $Y_x$ ), and the number ( $s$ ) of integer parameters ( $p_x$ ); and a calculation section that uses the prescribed real impulse constant ( $r$ ), the prescribed non-zero real constant ( $C$ ), the real number sequence initial values ( $Y_x$ ), the integer parameters ( $p_x$ ), and the prescribed positive integers ( $q_x$ ) to calculate a recurrence formula that is used to generate a PRNS ( $z'[y]$ ) of length  $N$ , and that outputs the PRNS ( $z'[y]$ ), where  $1 < y < N$ .